

time, wherein the interactive request includes any one or more of pause, slow motion, fast forward, rewind, jump forward, and jump backward.

26. (New) The method of Claim 25, wherein the media client is merged to the selected multicast media stream in response to a pause interactive request lasting for a pause time according to the following algorithm:

If  $m \times \text{stream interval} \leq T_{\text{Pause}}$   
<  $(m+1) \times \text{stream interval}$ ,  
then merge to  $M(k+m)$  stream

*Don't* where  $M(k)$  is the selected multicast media stream,  $T_{\text{Pause}}$  is the pause time, and  $m$  is a positive integer.

27. (New) The method of Claim 25, wherein the media client plays the media at a slower speed in response to the slow motion interactive request, and joins the selected multicast media stream before all of the media in the buffer is played.

28. (New) The method of Claim 25 further including the steps of

- caching the selected multicast media stream in an interactive server; and
- generating at least one unicast media stream from the interactive server to the media client in response to a fast forward, rewind, jump forward, or jump backward interactive request from the media client.

29. (New) The method of Claim 28 furthering including the step of generating an interactive unicast media stream from the interactive server to the client containing media at a requested speed in forward or reverse direction in response to a corresponding fast forward or rewind interactive request from the media client, wherein said media starts at the time when the interactive request is generated from the media client.

30. (New) The method of Claim 29 further including the step of generating a merging unicast media stream from the interactive server to the client containing media starting at the time when the interactive request is terminated, wherein the merging unicast media stream transmits media at a rate higher than the selected multicast media stream, such that the media client merges to the selected multicast media stream after the interactive request is performed.

31. (New) The method of Claim 30, wherein the interactive request is a fast forward interactive request, and the media client is merged to the subsequent selected multicast media stream according to the following algorithm:

If  $m \times \text{stream interval} \leq (P_{MC} - P_{FF}) - (T_{FF} + T_{Fill})$   
 $< (m+1) \times \text{stream interval}$   
then merge to  $M(k-m)$  stream

where  $M(k)$  stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client,  $P_{FF}$  is the play-time to begin fast forward operation,

$P_{MC}$  is the play-time to resume the normal multicast media stream,  $T_{FF}$  is the time for the fast forward operation,  $T_{Fill}$  is the time required to fill the buffer by the merging unicast media stream, and  $m$  is a positive integer.

32. (New) The method of Claim 30, wherein the interactive request is a rewind interactive request, and the media client is merged to the subsequent selected multicast media stream according to the following algorithm:

If  $m \times \text{stream interval} \leq T_{FF} + T_{Fill} + (P_{REW} - P_{MC})$   
<  $(m+1) \times \text{stream interval}$   
then merge to  $M(k+m)$  stream

where  $M(k)$  stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client,  $P_{REW}$  is the play-time to begin rewind operation,  $P_{MC}$  is the play-time to resume the normal multicast media stream,  $T_{FF}$  is the time for the rewind operation,  $T_{Fill}$  is the time required to fill the buffer by the merging unicast media stream, and  $m$  is a positive integer.

33. (New) The method of Claim 28 further including the step of generating a merging unicast media stream from the interactive server and to the media client containing media starting at a requested jumping time in response to a jump forward of jump backward

interactive request such that the media client merges to the selected multicast media stream after the interactive request is performed.

34. (New) The method of Claim 33, wherein the interactive request is a jump forward interactive request, and the media client is merged to the selected multicast media stream according to the following algorithm:

If  $m \times \text{stream interval} \leq (P_{MC} - P_{JF}) - T_{Fill}$   
 $< (m+1) \times \text{stream interval}$ ,  
then merge to  $M(k-m)$  stream

where  $M(k)$  stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client,  $P_{JF}$  is the play-time to begin jump forward operation,  $P_{MC}$  is the play-time to resume the normal multicast media stream,  $T_{Fill}$  is the time required to fill the buffer by the merging unicast media stream, and  $m$  is a positive integer.

35. (New) The method of Claim 33, wherein the interactive request is a jump backward interactive request, and the media client is merged to the selected multicast media stream according to the following algorithm:

If  $m \times \text{stream interval} \leq T_{Fill} + (P_{JB} - P_{MC})$   
 $< (m+1) \times \text{stream interval}$ ,  
then merge to  $M(k+m)$  stream

where  $M(k)$  stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client,  $P_{JB}$  is the play-time to begin jump backward operation,  $P_{MC}$  is the play-time to resume the normal multicast media stream,  $T_{Fill}$  is the time required to fill the buffer by the merging unicast media stream, and  $m$  is a positive integer.

36. (New) The method of Claim 29 further including the step of terminating the unicast media stream at the time when the interactive request is terminated.

37. (New) In a system for delivering media to a plurality of media clients through a network by a plurality of multicast media streams being repeated at regular stream intervals, each media client having a buffer for caching media of a selected media stream within one stream interval and processing capability for playing the media, wherein a media client is split from the selected media stream when an interactive request is submitted by said media client lasting for an interactive time, a processor for playing the media and merging said media client to a suitable multicast media stream after the interactive request is performed, wherein the processor incorporates an algorithm for comparing multiples of the regular stream interval with the interactive time, and the interactive request includes any one or more of pause, slow motion, fast forward, rewind, jump forward, and jump backward.

38. (New) The processor of Claim 37, wherein the media client is merged to the selected multicast media stream in response to the pause interactive request lasting for a pause time according to the following algorithm:

If  $m \times \text{stream interval} \leq T_{\text{Pause}}$   
 $< (m+1) \times \text{stream interval}$ ,  
then merge to  $M(k+m)$  stream

where  $M(k)$  is the selected multicast media stream,  $T_{\text{Pause}}$  is the pause time, and  $m$  is a positive integer.

39. (New) The processor of Claim 37, wherein the processor plays the media at a slower speed in response to the slow motion interactive request, and joins the selected multicast media stream before all of the media in the buffer is played.

40. (New) The processor of Claim 37, wherein the interactive request is a fast forward interactive request, and the media client is merged to the subsequent selected multicast media stream according to the following algorithm:

If  $m \times \text{stream interval} \leq (P_{\text{MC}} - P_{\text{FF}}) - (T_{\text{FF}} + T_{\text{Fill}})$   
 $< (m+1) \times \text{stream interval}$   
then merge to  $M(k-m)$  stream

where  $M(k)$  stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client,  $P_{FF}$  is the play-time to begin fast forward operation,  $P_{MC}$  is the play-time to resume the normal multicast media stream,  $T_{FF}$  is the time for the fast forward operation,  $T_{Fill}$  is the time required to fill the buffer by the merging unicast media stream, and  $m$  is a positive integer.

41. (New) The processor of Claim 37, wherein the interactive request is a rewind interactive request, and the media client is merged to the subsequent selected multicast media stream according to the following algorithm:

If  $m \times \text{stream interval} \leq T_{FF} + T_{Fill} + (P_{REW} - P_{MC})$   
<  $(m+1) \times \text{stream interval}$   
then merge to  $M(k+m)$  stream

where  $M(k)$  stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client,  $P_{REW}$  is the play-time to begin rewind operation,  $P_{MC}$  is the play-time to resume the normal multicast media stream,  $T_{FF}$  is the time for the rewind operation,  $T_{Fill}$  is the time required to fill the buffer by the merging unicast media stream, and  $m$  is a positive integer.

42. (New) The processor of Claim 37, wherein the interactive request is a jump forward interactive request, and the media client is merged to the selected multicast media stream according to the following algorithm:

If  $m \times \text{stream interval} \leq (P_{MC} - P_{JF}) - T_{Fill}$   
<  $(m+1) \times \text{stream interval}$   
then merge to  $M(k-m)$  stream

where  $M(k)$  stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client,  $P_{JF}$  is the play-time to begin jump forward operation,  $P_{MC}$  is the play-time to resume the normal multicast media stream,  $T_{Fill}$  is the time required to fill the buffer by the merging unicast media stream, and  $m$  is a positive integer.

43. (New) The processor of Claim 37, wherein the interactive request is a jump backward interactive request, and the media client is merged to the selected multicast media stream according to the following algorithm:

If  $m \times \text{stream interval} \leq T_{Fill} + (P_{JB} - P_{MC}) -$   
<  $(m+1) \times \text{stream interval}$   
then merge to  $M(k+m)$  stream

where  $M(k)$  stream is the selected multicast media stream before the fast forward interactive request is submitted by the media client,  $P_{JB}$  is the play-time to begin jump backward operation,  $P_{MC}$  is the play-time to resume the normal multicast media stream,  $T_{Fill}$  is the time required to fill the buffer by the merging unicast media stream, and  $m$  is a positive integer.



44. (New) In a system for delivering media to a plurality of media clients through a network by a plurality of multicast media streams being repeated at regular stream intervals, each media client having a buffer for caching media of a selected media stream within one stream interval and processing capability for playing the media, wherein a media client is split from the selected media stream when an interactive request is submitted by said media client lasting for an interactive time, an interactive server for serving interactive request generated from a client including:

a buffer for caching the selected multicast media stream; and  
a unicast media stream generator for generating at least one unicast media stream from an interactive server to the media client in response to a fast forward, rewind, jump forward, or jump backward interactive request from the media client.

45. (New) The interactive server of Claim 44, wherein the unicast media stream generator generates an interactive unicast media stream to the client containing media at a requested speed in forward or reverse direction in response to a corresponding fast forward or rewind interactive request from the media client, wherein said media starts at the time when the interactive request is generated from the media client.

46. (New) The interactive server of Claim 45, wherein the unicast media stream generator generates a merging unicast media stream from the interactive server to the client containing media starting at the time when the interactive request is terminated, wherein the merging unicast media stream transmits media at a rate higher than the selected multicast

media stream, such that the media client merges to the selected multicast media stream after the interactive request is performed.

47. (New) The interactive server of Claim 44, wherein the unicast media stream generator generates a merging unicast media stream to the media client containing media starting at a requested jumping time in response to a jump forward or jump backward interactive request such that the media client merges to the selected multicast media stream after the interactive request is performed.

48. (New) The interactive server of Claim 44, wherein the unicast media stream generator terminates the unicast media stream at the time when the interactive request is terminated.

---

A-1  
Concl.